MICROPROPAGATION

A RAPID MEANS OF SUGARCANE PROPAGATION

I. INTRODUCTION

Micro propagation is an aseptic (free from microorganism) method of plant propagation by which small plant parts/plantlets are initiated to grow and multiply in a culture medium. It has a potential to increase the rate of producing planting materials in just a short period.

The micropropagation technology has been developed and utilized by SRA in its high yielding varieties in support to the varietal development program that aims to increase productivity.

II. IMPORTANT FEATURES

Uses small plant parts as initial planting materials

The micro propagation technique is very efficient for faster multiplication of sugarcane varieties since it only requires a small tissue to initiate the culture, i.e. sugarcane tip about 1 cm long and 0.5 cm big including the meristem.

Very rapid means of propagation

The multiplication rate of planting material is exponential. From its shoot tip, more than 10,000 plantlets can be produced in 145 days.

Space Savers

The technology requires only a small room to grow a large number of cultures. A 20 sq m room can maintain 50,000 cultures that could produce and release 10,000 plantlets to the nursery.

Planting materials are easy to handle and transport

Shoots/plantlets are ideal materials for local and international movements. Plantlets are lighter in weight and less bulky. It can be packed in small paper boxes (41.0 x 28.0 x 11.5 cm) which can hold 15,000 to 20,000 plantlets. Transport of plantlets is easier and can reach more areas faster.

Produces disease free planting materials

Producing plantlets in vitro minimizes the risk of introduction of pests and pathogens. Due to aseptic state of cultures, many contaminants can be detected and discarded earlier.

III. A POTENTIAL RAPID MEANS OF PROPAGATION

It was observed that micro propagated plantlets produce more tillers than the conventionally grown plants. One plant or stool produces 6-14 tillers in six months resulting to higher cane point production per hectare.

Plantlet production from one sugarcane shoot tip

Growth Stage	Durati (days)	Type of Explants	No. Of explants Used	No. Of Plants Produced	Multip-lication Rate
I. Culture Establish ment	60	Shoot tip	1	3	3
II. Shoot Mult.					
Cycle 1	20	Shoot/ Tiller	3	21	7
Cycle 2	20	-do-	21	147	7
Cycle 3	15	-do-	147	661	4.5
Cycle 4	15	-do-	500	2,552	5.1
Cycle 5	15	-do-	2,400	11,760	4.9
III. Rooting shoots	15	Multiple	10,000	12,000	1.2
IV. Nursery Planting	45	Rooted Plantlets	10,304	9,779	

Cane point production from micro propagated plantlets at Canticbil Farm, La Castelllana, Neg. Occ. 6 months after planting (Morales & Dullan, 1994)

Area planted	0.5 ha
Number of plantlets planted	9,779
Number of plantlets that survived	9,583
Survival rate	98.0%
Range of productive tillers/plant	6-14
Ave. no. of productive tillers/plant	8.42
Range of 2-eye cane points produced/plant	69.87
Total no. of cane points produced	640,000

IV. ECONOMICS

One hardened plantlet costs P2.50. One hectare accommodates 25,000 plantlets.

No. of plantlets released since 1994

Year	Number
1994	653,000*
1995	534,750*
1996	1,571,950*
1997	507,100*
1998	327,666
1999	361,865
2000	280,800
2001	310,125
2002	205,031
Sub-total	**4,753,187**
SRA-DA-NAFC Special Project 1995-1998	439.980
Grand total	**5,193,167**

** - not hardened*

Tips in handling micro propagated plantlets

1. To minimize mortality, handle the plantlets carefully during loading and unloading from the nursery to the field.
2. Plant immediately upon arrival in the field. If it is not possible to plant immediately, place the plantlet in an upright position in an open area (do not place plants in close garage); water the plants twice a day.
3. Do not delay transplanting in the field for more than 2 days.
4. Plant micro propagated plantlets 40 cm between hills and 1 meter between furrows or 50 cm apart in 0.75 m. furrows.
5. Irrigate the field within 24 hours after planting.
6. Microprorogated plantlets are maintained similarly as the commercial canes but irrigation must be regular to minimize wilting of the plants.
7. Fertilize the field with 200-15-200 kg/ha NPK. Split application of N & K into two doses, ½ at transplanting and ½ 2 months after planting.
8. As a preventive measure to downy mildew infection, spray fungicides (metalaxyl) 5-10 days after planting or after uncurling of newly emerged leaves.

SRA MICROPROPAGATED HIGH YIELDING VARIETIES

Phil 8477, Phil 8583, Phil 8727
Phil 8829, Phil 8835, Phil 8839
Phil 8943, Phil 90-0345
Phil 91-1091, Phil 92-0051
Phil 92-0577, Phil 92-0751
Phil 93-3727, Phil 93-2349
Phil 93-3155, Phil 93-3849
Phil 94-0913

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A RAPID MEANS OF PROPAGATING NEW HIGH YIELDING VARIETIES